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CLAIMS

- 1 1. A method for minimizing errors when writing information to a magnetic
2 memory cell array with operating write currents, wherein the magnetic memory cell
3 array comprises at least one reference cell having known operating characteristics and
4 a magnetization with an alterable orientation, the method comprising:
5 applying test write currents having pre-selected attributes for altering
6 orientation of the magnetization of the reference cell;
7 determining whether or not the orientation of the magnetization in the
8 magnetic memory cell was altered; and
9 modifying the operating write currents based upon whether or not the
10 orientation of the magnetization in the reference cell was altered.

- 1 2. The method of claim 1 wherein the reference cell further comprises an array of
2 reference cells having different attributes and wherein the operating write currents are
3 modified based upon which reference cells in the array of reference cells had the
4 orientation of their magnetization altered by the test write current.

- 1 3. The method of claim 2 wherein each reference cell in the array of reference
2 cells has a different junction size.

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1 4. The method of claim 1 wherein the reference cell further comprises an array of
2 reference cells having similar attributes and wherein the step of applying test write
3 currents to alter orientation of the magnetization of the reference cell further
4 comprises providing each reference cell with a different test write currents having pre-
5 selected attributes and the operating write currents are modified based upon which test
6 currents altered the orientation of the magnetization of the reference cells.

1 5. The method of claim 1 wherein the magnetic memory cells are rotational
2 magnetic memory cells.

1 6. The method of claim 4 wherein variations in the test write currents are
2 generated by varying an attribute of wires carrying the test write currents to the
3 reference cells.

1 7. The method of claim 1 comprising sinusoidally varying test write currents,
2 measuring a phase difference between the test write currents and the switching of the
3 orientation of the magnetization in the reference cell and modifying the operating
4 write currents based upon the measured phase difference.

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1 8. A compensation circuit for determining appropriate write signals to use during
2 a write operation to an array of magnetic memory cells wherein each magnetic
3 memory cell in the array has a magnetization with an orientation that is alterable
4 between at least two states, said compensation circuit comprising:
5 a write signal generator for generating write signals that are used to selectively
6 alter the orientation of magnetization in the magnetic memory cells in the array of
7 magnetic memory cells and a test write signals;
8 a reference cell having a magnetization with an orientation that is alterable
9 between at least two states for receiving the test write signals from the write signal
10 generator; and
11 a reference cell reader for determining the orientation of the magnetization in
12 the reference cell after the reference cell has received the test write signals;
13 wherein the write signal generator selectively modifies the write signals based
14 upon the orientation of the reference cell after the reference cell has received the test
15 write signals.

1 9. The circuit of claim 8 wherein the reference cell comprises an array of
2 reference cells having different attributes and wherein the write signal generator
3 selectively modifies the write signals based upon which reference cells in the array of
4 reference cells had the orientation of their magnetization altered in response to
5 receiving the test write signals.

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1 10. The circuit of claim 8 wherein the reference cell further comprises an array of
2 reference cells having similar attributes, the test write signals received by each
3 reference cell is modified by a signal modification circuit associated with each
4 reference cell and the write signals are modified based upon which reference cells had
5 the orientation of their magnetization altered in response to being sent the test write
6 signals.

1 11. The circuit of claim 8 wherein each magnetic memory cell comprises an
2 rotational magnetic memory cell.

1 12. The circuit of claim 10 wherein each signal modification circuit comprises
2 wires for carrying the test write signals to an associated reference cell wherein the
3 wires for each signal modification circuit has different attributes.

1 13. The circuit of claim 8 wherein said test write signals are varied with respect to
2 time and wherein the write signals are modified based upon a measured phase
3 difference between the test write signals and the corresponding variations in the
4 orientation of the magnetization of the reference cell.

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- 1 14. The circuit of claim 13 wherein the test write signals are varied sinusoidally.
- 1 15. A method for compensating for changes in an optimum operating point for
2 write signals used to alter an orientation of a magnetization in a magnetic memory cell
3 in an array of magnetic memory cells, said method comprising:
4 measuring changes in switching characteristics of a reference magnetic
5 memory cell; and
6 modifying attributes of the write signals used to alter the orientation of the
7 magnetization in the magnetic memory cells based upon the measured changes in the
8 switching characteristics of the reference magnetic memory cell.
- 1 16. The method of claim 15 wherein the step of measuring changes in switching
2 characteristics of a reference magnetic memory cell further comprises sending test
3 signals to a series of magnetic memory cells having predetermined attributes and
4 determining which magnetic memory cells have the orientation of their magnetization
5 altered by the test signals.
- 1 17. The method of claim 15 wherein the step of measuring changes in switching
2 characteristics of a reference magnetic memory cell comprises sending a test signals to
3 an array of similar magnetic memory cells such that each magnetic memory cell is
4 driven by a different magnetic field and determining which magnetic memory cells
5 have the orientation of their magnetization altered by the test signals.
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1 18. The method of claim 17 wherein the magnetic memory cells comprise
2 rotational magnetic memory cells.

1 19. The method of claim 17 wherein the different magnetic fields for driving the
2 reference magnetic memory cells are created by providing each reference magnetic
3 memory cell with write wires having a different attributes.
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1 20. The method of claim 15 wherein the step of measuring changes in switching
2 characteristics of a reference magnetic memory cell comprises sending sinusoidally
3 varying test signals to a reference magnetic memory cell and measuring a phase
4 difference between the test signals and changes in the orientation of the magnetization
5 of the reference magnetic memory cell.